

Amendments to Claims:

This listing of claims will replace all prior versions and listings of the claims in the application:

Listing of Claims:

1. (currently amended) A fusing system of an image forming apparatus comprising:
a fusing unit having a fusing roller and a heater for heating the fusing roller; ~~and~~
a fusing temperature control unit having a paper feeding part having at least one of a
pickup roller for picking up a sheet of printing paper and a paper jam sensor;
a sensor part for sensing a surface temperature Temp of the fusing roller; and
a controller for determining whether it is time to drive the heater for heating the fusing
roller of the fusing unit, wherein the time to drive the heater is based on at least a time when a
sheet of printing paper is fed by the paper feeding part, and driving the heater when it is time to
start ~~adrive the heater driving start timing.~~

2. (currently amended) The fusing system of claim 1, wherein a sheet of printing paper is
fed by the paper feeding part when a sheet of printing paper is picked up by the pickup roller
and/or when a leading end of the sheet of printing paper picked up by the pickup roller operates
the paper jam sensor;

wherein the controller determines whether it is time to drive the heater by determining a
heater driving-start timeing, the heater driving-start time being determined on the basis of one or
more of a first time t1, second time t2 and a third time t3, and a second time t2, when a sheet of
printing paper is picked up by the pickup roller, and when a leading end of the sheet of printing
paper picked up by the pickup roller operates the paper jam sensor, the first time t1 being a time
from when the sheet of printing paper is picked up to a when the sheet of printing paper arrives
at the fusing roller, the second time t2 being a time required until a heat generated from the
heater reaches a surface of the fusing roller, and the third time t3 being a time from when the
sheet of printing paper operates the paper jam sensor to when the sheet of printing paper arrives
at the fusing roller; and

when determined that it is the heater driving-start timeing, calculatinges a heater driving

time t_h according to at least one factor selected from a target surface temperature T_t for the fusing roller that is a previously determined at a temperature required for fusing, a surface temperature $Temp$ of the fusing roller detected by the sensor part, and a changeable slope a of the surface temperature $Temp$ of the fusing roller, and then driving the heater for the calculated heater driving time t_h .

3. (currently amended) The fusing system of claim 2, wherein the heater driving-start time is determined by subtraction of the second time t_2 from the one of the first time t_1 and the third time t_3 .

4. (currently amended) The fusing system of claim 2, wherein the heater driving time t_h is calculated using the following mathematical formula:-

$$t_h = \alpha \times (T_t - Temp) - \beta \times a + \gamma,$$

where α is a proportional constant,

β is a differential coefficient, and

γ is a constant.

5. (currently amended) The fusing system of claim 2, wherein the determined heater driving-start time is delayed for a predetermined time based on a subtraction of the second time t_2 from at least one of the first time t_1 and the third time t_3 .

6. (currently amended) A temperature control method of a fusing system for use in an image forming apparatus comprising the steps of:-

determining whether it is a heater driving-start time to drive a heater for heating a fusing roller of a fusing unit, the heater driving-start time being based on at least a time when a sheet of printing paper is fed by a paper feeding part; and

driving the heater when it is determined that it is the heater driving-start time.

7. (currently amended) The temperature control method of claim 6, wherein the step of determining whether it is the heater driving-start time comprises the steps of:-

determining whether the sheet of printing paper is fed by the paper feeding part; and
determining whether it is the heater driving-start timing to drive the heater when it is determined that the sheet of printing paper is fed by the paper feeding part.

8. (currently amended) The temperature control method of claim 7, wherein the operation of determining whether the sheet of printing paper is fed by the paper feeding part comprises one of the steps of:

determining whether a pickup roller for picking up the sheet of printing paper of the paper feeding part is driven, and

determining whether a paper jam sensor is operated, the paper jam sensor being disposed at a lower part in a paper feed direction of the pickup roller.

9. (currently amended) The temperature control method of claim 8, wherein the operation of determining whether to initiate the heater driving-start timing comprises the steps of:

determining one of a first time t1 and a third time t3, and a second time t2, the first time t1 being a time from when the sheet of printing paper is picked up by the pickup roller to when the sheet of printing paper arrives at the fusing roller, the second time t2 being a time required until a heat generated from the heater reaches a surface of the fusing roller, and the third time t3 being a time from when the sheet of printing paper operates the paper jam sensor to when the sheet of printing paper arrives at the fusing roller; and

determining the heater driving-start timing by determining whether a difference in time t between the one of the first time t1 and the third time t3 and the second time t2 elapses.

10. (currently amended) The temperature control method of claim 9, wherein the operation of determining the heater driving-start timing comprises the step of:

delaying for a predetermined time after the difference in time t between one of the first time t1 and the third time t3 and the second time t2 has elapsed.

11. (currently amended) The temperature control method of claim 9, further comprising the steps of:

determining whether the second time t_2 is larger than the one of the first time t_1 and the third time t_3 after the operation of determining one of the first time t_1 , and the second time t_2 and the third time t_3 , ~~and the second time t_2~~ ; and

directly moving to the step of driving the heater when it is determined that the second time t_2 is larger than one of the first time t_1 and the third time t_3 .

12. (currently amended) The temperature control method of claim 9, further comprising the steps of:

determining whether ~~at~~ the surface temperature Temp of the fusing roller is above ~~at~~ the target surface temperature T_t after the operation of determining the heater driving-start time ~~ing~~ by determining whether the difference time t elapses; and

stopping the driving of the heater when it is determined that the surface temperature Temp of the fusing roller is above the target surface temperature T_t .

13. (currently amended) The temperature control method of claim 9, further comprising thea step of:

controlling to alternately turn on and off the heater when a printing speed exceeds a predetermined speed after the operation of determining the heater driving-start time ~~ing~~ by determining whether the difference time t elapses.

14. (currently amended) The temperature control method of claim 13, wherein the printing speed is determined by one ~~selected from an~~ of:

information of printing speed previously input in the image forming apparatus, a driving period of the pickup roller of the paper feeding part, and a feeding speed of the sheet of printing paper conveyed by a feed roller of the paper feeding part.

15. (currently amended) The temperature control method of claim 6, wherein the step of driving the heater comprises:

calculating a heater driving time t_h according to at least one factor selected from a target surface temperature T_t for the fusing roller previously determined at a temperature required in

fusing, a surface temperature Temp of the fusing roller detected by a sensor part, and a changeable slope a of the surface temperature Temp of the fusing roller, when it is determined that it is the heater driving-start time; and
driving the heater for the calculated heater driving time th.

16. (currently amended) The temperature control method of claim 15, wherein the heater driving-start time th is calculated by the following mathematical formula:

$$th = \alpha \times (T_t - Temp) - \beta \times a + \gamma,$$

where α is a proportional constant,
 β is a differential coefficient, and
 γ is a constant.

17. (new) A temperature control method of a fusing system for use in an image forming apparatus comprising the steps of:

determining whether it is a heater driving-start time to drive a heater for heating a fusing roller of a fusing unit when a sheet of printing paper is fed by a paper feeding part;

calculating a heater driving time th according to at least one factor selected from a target surface temperature Tt for the fusing roller previously determined at a temperature required in fusing, a surface temperature Temp of the fusing roller detected by a sensor part, and a changeable slope a of the surface temperature Temp of the fusing roller, when it is determined that it is the heater driving-start time; and

driving the heater when it is determined that it is the heater driving-start time and driving the heater for the calculated heater driving time th.

18. (new) The temperature control method of claim 17, wherein the heater driving-start time th is calculated by the following mathematical formula:

$$th = \alpha \times (T_t - Temp) - \beta \times a + \gamma,$$

where α is a proportional constant,
 β is a differential coefficient, and
 γ is a constant.